OWNER'S MANUAL

MODEL 24H

MULTIPORT CONTROLLER

Rev. 1.00 and higher

BayTech Publication #U140E055-01

Thank you for selecting a BayTech Model 24H multiport controller.

The data provided in this Owner's Manual explains the various ways you can operate your unit and configure it to your own computer system. We suggest that you read this manual carefully before attempting to install the Model 24H and that you place special emphasis on correct cabling and configuration. If you have any problems with your installation, please contact a BayTech applications engineer for assistance.

BayTech also manufactures other data communications devices that provide port sharing and expansion, port contention, buffered and non-buffered printer sharing, network print servers, and statistical multiplexing. If you would like information on any of these models, please contact BayTech Customer Service.

We welcome any comments you may have about our products. And we hope that you will continue to look to BayTech for your data communications needs.

NOTE: The information contained in this document is subject to change without notice.

Copyright 1994 by Bay Technical Associates, Inc.

IBM, IBM PC, IBM PC/AT, IBM PC/XT are products and registered trademarks of International Business Machines Corporation.

Hewlett-Packard LaserJet and Draftmaster I Plotter are products and registered trademarks of the Hewlett-Packard Company.

TABLE OF CONTENTS

1 GENERAL INFORMATION 1

2 SPECIFICATIONS 3

3 INSTALLATION 5

3.1 UNPACKING 5
3.2 UTILITY SOFTWARE DISKETTE 6
3.3 POWER 6

4 CABLING 7

4.1 PARALLEL PORTS 7
4.2 SERIAL PORTS 8

5 OPERATION 11

5.1 USER-PROGRAMMABLE FEATURES 11

5.1.1 SERIAL PORT CONFIGURATION 11
5.1.2 PARALLEL PORT DESTINATION 11
5.1.3 PORT LOGICAL NAME 12
5.1.4 PORT SELECT CODE 12
5.1.5 MESSAGE TERMINATING CHARACTER 13
5.1.6 DATA BLOCK LENGTH 13
5.1.7 MODES OF OPERATION 14

5.1.7.1 MODE OF OPERATION 1 14
5.1.7.2 MODE OF OPERATION 2 14
5.1.7.3 MODE OF OPERATION 3 15
5.1.7.4 MODE OF OPERATION 4 15
5.1.7.5 MODE OF OPERATION 5 15
5.1.7.6 MODE OF OPERATION 6 15

5.2 OPERATING IN THE DIFFERENT MODES 16

5.2.1 OPERATING IN MODE 1 17
5.2.2 OPERATING IN MODE 2 18
5.2.3 OPERATING IN MODE 3 18
5.2.4 OPERATING IN MODE 4 19
5.2.5 OPERATING IN MODE 5 19
5.2.6 OPERATING IN MODE 6 20

5.3 LED INDICATORS 20
5.4 BINARY MODE 21
5.5 DATA FLOW CONTROL 22

5.5.1 HARDWARE HANDSHAKING 22
5.5.2 XON/XOFF HANDSHAKING 23

6 CONFIGURATION 25

6.1 MAIN CONFIGURATION MENU 26
6.2 STATUS 27
6.3 SET SERIAL PORT CONFIGURATION 29
6.4 CHANGE PARALLEL PORT DESIGNATION 32
6.5 CHANGE PORT LOGICAL NAME 33
6.6 PROGRAM PORT SELECT CODE 35
6.7 CHANGE MESSAGE TERMINATE CHARACTER 36
6.8 CHANGE DATA BLOCK LENGTH 37
6.9 CHANGE MODE OF OPERATION 37

7 MAINTENANCE 38

7.1 RETURNS TO THE FACTORY 38
7.2 REPACKING FOR SHIPPING 38

8 TECHNICAL SUPPORT 39

9 FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFACE STATEMENT 40

APPENDIX A
TROUBLESHOOTING 41

APPENDIX B
INDEX 46

1 GENERAL INFORMATION

The Model 24H Data Exchange System is a versatile, multi-function data communication product that allows a single host computer system such as an IBM PC to individually select up to twenty-three peripheral devices (e.g., bar code readers, security systems, digital instruments, etc.) and send data to the selected device. The Model 24H will simultaneously multiplex incoming data from the peripheral devices to be transmitted to the host system. The method of data transmission from the peripheral devices to the host system is dependent upon the mode of operation. The Model 24H features six user-selectable modes of operation. The six modes of operation are described below.

Mode 1 **Full Duplex Communication** - Increases input/output capabilities by allowing a single host computer to switch between a maximum of twenty-three peripheral devices. Provides bidirectional data transfer between the host computer and the selected peripheral device.

Mode 2 **All messages from all ports** - Provides automatic multiplexing of all messages from all peripheral devices. Data is buffered until a terminating character is received or until the buffer is full. The messages are then sent to the host device preceded by a port identification code.

Mode 3 **Single message from all ports** - Same as Mode 2 (above), except that a single message is sent to the host device from all peripheral devices upon request from the host.

Mode 4 **All messages from selected port** - Same as Mode 2 (above), but with specific port selection.

Mode 5 **Single message from selected port** - Same as Mode 3 (above), but with specific port selection.

Mode 6 **Time division multiplexing** - Provides automatic multiplexing of data from peripheral devices by continuously scanning all ports to check for characters in the receive buffers. If a receive buffer contains data, it is transmitted through the host port in data blocks with each data block preceded by a port identification code. Transmission continues until the buffer is empty or until a user-specified data block length has been transmitted.

In addition to the modes of operation, you may select the serial port configuration (baud rate, word size, stop bits, parity and XON/XOFF) for each port, the port select code, the message terminate character, and the data block length. These configuration changes are accomplished by entering the menu-driven configuration mode. Changes are saved in non-volatile memory. The Model 24H will translate between peripheral devices of different configurations.

Figure 1 below shows six applications, one for each mode of operation.

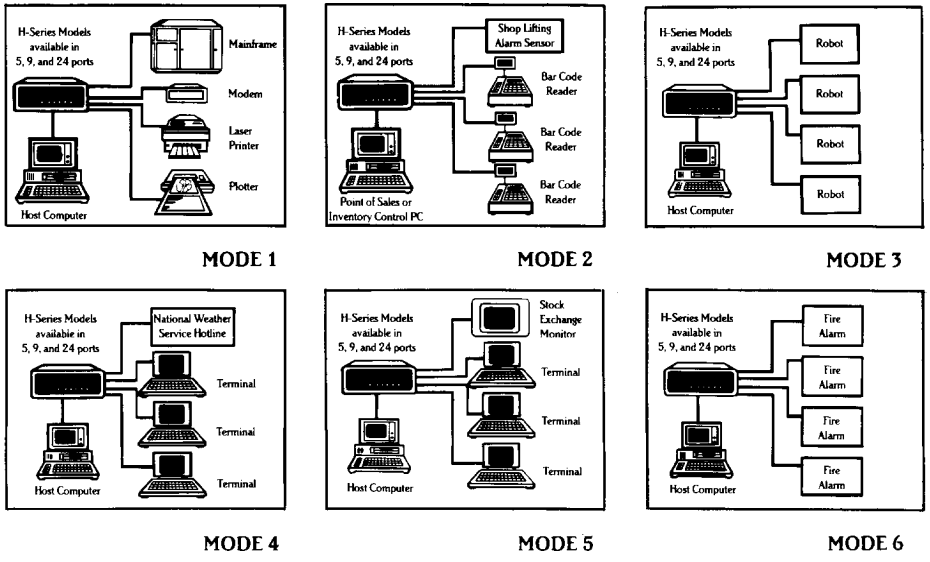

Figure 1

2 SPECIFICATIONS

INTERFACE: Serial ports - Asynchronous EIA-232 (CCITT V.24), -12v mark, +12v space. Full duplex communication. Optional EIA-422 and current loop.
Parallel ports - Centronics protocol.

I/O MODULES: (Maximum 6 I/O modules per unit; minimum 2 serial ports per unit.)
Four EIA-232 DTE ports (MOD 24-4C)
Four EIA-232 DCE ports (MOD 24-4CF)
Two EIA-232 DTE ports/two parallel ports (MOD 24-4E)
Four parallel ports (MOD 24-4A)
Four current loop ports (MOD 24-4L)
Four EIA-422 ports (MOD 24-4Y)

NOTE: Parallel communication is strictly unidirectional (i.e., data flow may flow only from the parallel peripheral device to the host device or from the host device to the selected parallel peripheral device).

STANDARD FACTORY DEFAULT POWER-UP CONFIGURATION:

Baud rate: 9600.
Word size: 8 bits.
Parity: None.
Stop bits: 1.
XON/XOFF: Disabled.
Parallel port destination: Input.
Logical Name: Port 1 - Device A Host
Ports 2 to 24 - Device B to Device X.
Port select code: $SELECT.
Data block length: 32 characters.
Terminating Character: Carriage Return (0D Hex).
Mode of operation: Mode 1 - Port expansion/sharing.

USER-PROGRAMMABLE CONFIGURATIONS:

Reconfigurable in menu-driven mode through host port (Port 1). Saved in non-volatile memory to become the new power-up default configuration.

Baud rate*: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400. Other rates optional.
Word size*: 7 or 8 bits.
Parity*: Even, odd or none.
Stop bits*: 1 or 2.
XON/XOFF*: Enabled or disabled individually for transmit and receive.
Parallel Port Destination: Input or Output.
Port Logical Name*: Maximum 16 characters.
Port select code: Any ASCII character string up to 8 characters.
Terminate character: Any code from 00 Hex to 7F Hex.
Data block length: 1 to 250 characters.
Mode of operation: 1 through 6.

* Option is configurable per port

INTERNAL BUFFER: Spooling message buffer - standard 512K, available up to 4.5MB.

POWER: 115 VAC, 50/60 Hz.,0.3A.
Optional 230 VAC, 50/60 Hz., 0.2A.

ENVIRONMENT: 0 degrees to 55 degrees C temperature; 5% to 95% humidity.

DIMENSIONS: 16.75w x 10d x 3.5h inches.

WEIGHT: 9 1/2 lbs. with 6 modules installed.
8 lbs. with no I/O modules installed.

INDICATORS: 1 green power LED; 24 red port-activity LEDs.

CONNECTORS: Shielded on all ports.
Serial ports - DB-25 male DTE connectors.
(Optional DB-25 female DCE connectors)
Parallel ports - DB-25 female connectors.

HANDSHAKING: CTS/DTR and selectable XON/XOFF.

MOUNTING: Desk-top; rack-mount optional.

WARRANTY: One year on parts and labor.

3 INSTALLATION

3.1 UNPACKING

After opening the box, check the packing list that comes with your Model 24H to ensure that you have received all components. At a minimum you should have received the unit, this manual and any applicable addendums, and a software utility diskette. Also check the unit to make certain that it did not receive damage during shipping. If items are missing or damage did occur, please contact BayTech technical support at 1-800-523-2702.

3.2 UTILITY SOFTWARE DISKETTE

BayTech provides utility software for DOS compatible PCs to assist you in configuring the Model 24H. This diskette contains the following programs: REMCONFG.COD, SMODE.EXE, TERM.EXE, AND README.RDM. The Model 24H does not utilize the REMCONFG.COD file. TERM.EXE is a terminal emulation program used to configure the various features of the unit. SMODE.EXE is a program used to configure COM ports of DOS compatible machines to operate at speeds faster than 9600 bps.

IMPORTANT: Copy the BayTech original diskette onto a blank diskette and store the original in a safe place. Read your operating systems manual for copying instructions.

Please review the README.RDM file to obtain instructions for TERM.EXE and SMODE.EXE. To view the README.RDM file on your screen, first insert the diskette into your PC's disk drive and then enter the command **TYPE README.RDM** from your disk drive prompt. To print this file, enter the command **COPY README LPT1:** from your disk drive prompt.

3.3 POWER

The standard Model 24H requires 115VAC, 50/60 Hz. power and comes with a three-prong power cord. Do not attempt to operate the unit with a two-prong socket or adapter. 230 VAC, 50/60 Hz. is optional.

All Model 24H models power-up when you depress the power switch, located on the back of the unit, to "ON". The green power LED on the front panel will illuminate when power is applied.

CAUTION: Do not attempt to make any internal changes. Any upgrades to EPROM, memory, or module installation must be performed by an authorized service technician or by BayTech. Please contact BayTech at 1-800-523-2702.

4 CABLING

Please see *Section 4.1* if you are interfacing to a parallel port or *Section 4.2* if interfacing to a serial port.

4.1 PARALLEL PORTS

Parallel ports on the MOD 24-4A or MOD 24-4E I/O modules have DB-25 female connectors. A straight, DB-25 male-to-male cable is required between each IBM PC computer (or compatible) and the parallel ports on the Model 24H. A DB-25 male to Centronics cable is required between each peripheral having a Centronics connector and the Model 24H (same as IBM PC to Centronics cable).

CAUTION: Some standard EIA-232 DB-25 cables may have Pin 1 grounded to the connector shell. Since Pin 1 is the Strobe signal in Centronics protocol, this ground must be removed if the cable is used between an IBM PC and the Model 24H.

The pin assignment for the DB-25 connector is similar to the IBM PC parallel connector and uses the following signals for communication:

DB-25 PIN NO.	SIGNAL NAME
1	- Strobe
2	+ Data Bit 0
3	+ Data Bit 1
4	+ Data Bit 2
5	+ Data Bit 3
6	+ Data Bit 4
7	+ Data Bit 5
8	+ Data Bit 6
9	+ Data Bit 7
10	- Acknowledge
11	+ Busy
12	+ P. End (Out of Paper)
13	+ Select
14	- Auto Feed
15	- Error
16	- Initialize Printer
17	- Select Input
18-25	Ground

4.2 SERIAL PORTS

IMPORTANT: Before you proceed with cabling, you must know whether the devices to which you will connect the Model 24H are DTE (Data Terminal Equipment) or DCE (Data Communication Equipment). The following devices are generally DTE: terminals, printers, computers like the IBM PC. The following devices are DCE: modems and some computers. To verify the interface requirements, please refer to the Owner's Manual for your device.

Serial ports on the MOD 24-4C and MOD 24-4E I/O modules have DB-25 male DTE connectors. DTE ports use the following signals for communication:

DTE PORT PIN/SIGNAL DEFINITION			
Pin	Signal (EIA-232)	Direction	Description
1	PGND	---	Protective Ground
2	Tx	Output	Data Out
3	Rx	Input	Data In
4	RTS	Output	+ Voltage When Model 24 Powers-up
5	CTS	Input	Model 24 Transmit Enabled When +12 Volts. Internally Enabled If No Wire Connected
7	SGND	---	Signal Ground
20	DTR	DTR	- Voltage When Model 24 Print Buffer Full

Serial ports on the MOD 24-4CF I/O module have DB-25 female DCE ports. DCE ports use the following signals for communication:

DCE PORT PIN/SIGNAL DEFINITION			
Pin	Signal (EIA-232)	Direction	Description
1	PGND	---	Protective Ground
2	Tx	Input	Data In
3	Rx	Output	Data Out
4	RTS	Input	Internally Enabled if No Wire Connected (Normally Not Used)
5	CTS	Output	-12V When Buffer is Full
6	DSR	Output	+12V When Model 24H Powers Up
7	SGND	---	Signal Ground
8	DCD	Output	+12V When Model 24 Powers Up
20	DTR	Input	Transmit Enabled When +12V

If you are interfacing a DCE device to the Model 24H (DTE), you must use a one-to-one or straight cable as shown in *Figure 2*. If you are interfacing a DTE device to the Model 24H (DTE), you must use a crossed cable as shown in *Figure 3*.

When using XON/XOFF protocol, it may be desirable to use cables with only Tx, Rx and GND (Signal Ground) connected. On the serial ports of a BayTech Model 24H, input handshaking lines are enabled if nothing is connected, allowing the system to operate with only Tx, Rx and GND connected.

CAUTION: Do not attempt to use a serial cable on a parallel port. Since an EIA-232 serial port usually carries a potential of +12 and -12 volts, plugging a serial cable from that port into a parallel port may cause damage to the parallel port.

M24H - DTE
FEMALE DB-25

DCE DEVICE
MALE DB-25

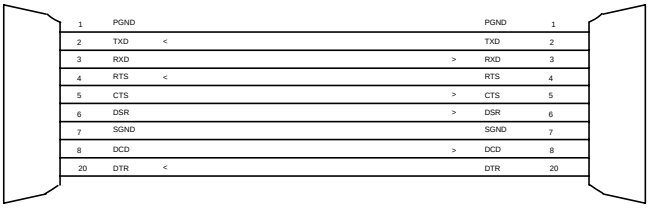

Figure 2: **M24H (DTE) to DCE Device**

M24H - DTE
FEMALE DB-25

DTE DEVICE
FEMALE DB-25

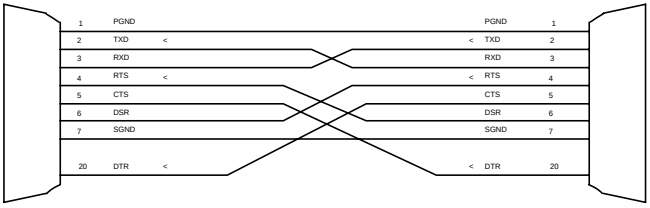

Figure 3: **M24H (DTE) to DTE Device**

5 OPERATION

The BayTech Model 24H is a user-programmable, multifunction device that allows serial port expansion/sharing, time division multiplexing, and message multiplexing. This solution is ideal for adapting small computers like the IBM PC to industrial process control and data gathering applications. Up to twenty-three peripheral devices may be multiplexed to a single host computer or terminal.

5.1 USER-PROGRAMMABLE FEATURES

You may select from six modes of operation. Other programmable features include the serial port configuration for each individual port, the data block length, the message terminating character, and the port select code. These features are programmed by accessing the menu-driven configuration mode.

5.1.1 SERIAL PORT CONFIGURATION

The Model 24H will translate for devices using different serial configurations. You may set the baud rate, word size, stop bits, parity and XON/XOFF handshaking for each individual port.

Factory default configuration on serial ports is 9600 baud rate, 8 bit word size, 1 stop bit, no parity and XON/XOFF disabled.

5.1.2 PARALLEL PORT DESTINATION

You may configure parallel ports on the Model 24H to be either input or output. For parallel ports defined as input, data will flow from the peripheral device to the host device only. For parallel ports defined as output, data will from the host device to the parallel peripheral device only when the host device selects the parallel peripheral port.

Factory default parallel port destination is input for all parallel ports.

5.1.3 PORT LOGICAL NAME

The Model 24H allows the host device to assign an individual logical name to each peripheral port for reference while the unit is in configuration mode.

Factory default for ports on individual ports is Device A Host for Port 1, Device B for Port 2, ..., and Device X for Port 24.

5.1.4 PORT SELECT CODE

The Model 24H allows the host device to program the port select code to be any ASCII character string up to eight ASCII characters. The port select code is used to select specific peripheral ports, to request messages, and for port identification purposes.

In order to select a specific peripheral port to send data to, the host device sends the port select code, the desired port number (02 to 24), and a terminating character (0D Hex - *Carriage Return* or 0A Hex - *Line Feed*). This port select sequence applies in all modes of operation.

The port select code followed by ASCII capital **S** is also sent by the host device to request messages from the peripheral devices in modes 3 through 5 of operation.

The port select code followed by a two-digit number is sent to the host device preceding each data block for port identification purposes in Mode 6 of Operation.

The factory default port select code is $SELECT.

5.1.5 MESSAGE TERMINATING CHARACTER

This is a single character that indicates a completed message to the Model 24H in Modes of Operation 2, 3, 4 and 5. Data is held in the buffer of the Model 24H until the terminating character is received from the host device which defines a complete message. The complete message is eventually sent to the host device depending on which mode of message multiplexing the Model 24H is in. The message terminating character may be programmed to be any two-digit hexadecimal character from 00 Hex to 7F Hex.

The factory default message terminating character is Carriage Return (0D Hex).

5.1.6 DATA BLOCK LENGTH

The data block length is the maximum number of characters per data block transmitted out of the host port while operating in Mode 6 (time division multiplexing). You may select a data block length of 8 to 240 characters.

Factory default is 32 characters.

5.1.7 MODES OF OPERATION

NOTE: For illustration purposes, the factory default port select code ($SELECT) will be used in the following descriptions of the Modes of Operation. *Section 5.2* provides more detail for operating in the various modes.

5.1.7.1 MODE OF OPERATION 1

Mode of Operation 1 increases input/output by interfacing a single port on a computer to up to 23 peripheral devices. The communication is full duplex between the host device and the selected peripheral device. For the host device to select a specific peripheral port, it would send $SELECT, the desired port number (02 to 24), and a terminating character (0D Hex - *Carriage Return* or 0A Hex - *Line Feed*). The host remains connected to the selected peripheral port until another peripheral port is selected.

For example, if the host device wishes to select the device connected to Port 4, it would send **$SELECT04<CR>** where <CR> is a *Carriage Return*.

NOTE: Peripheral port selection is done in the manner described above for all Modes of Operation.

Factory default is Mode 1 with the host port connected to port 2 on power-up.

5.1.7.2 MODE OF OPERATION 2

Mode of Operation 2 provides multiplexing to the host port of all messages from all peripheral ports automatically. Data is buffered until an end of message terminating character is received or until the buffer is full. The messages are sent to the host device preceded by a port identification number corresponding to the port number of the peripheral port that actually sent the message.

5.1.7.3 MODE OF OPERATION 3

Mode of Operation 3 provides multiplexing to the host port of a single message from all peripheral ports. Single messages from each peripheral port are sent to the host device only when a command is received requesting them. When the host device sends a request for message command, the Model 24H will send a complete message from each peripheral port to the host port preceded by a port identification number corresponding to the port from which the message came. Complete messages are sent to the host port in a round-robin fashion.

5.1.7.4 MODE OF OPERATION 4

Mode of Operation 4 provides multiplexing to the host port of all messages from a selected peripheral port. You select a particular peripheral port and all complete messages in the buffer for that port are transmitted to the host device automatically with each message preceded by a port identification number.

5.1.7.5 MODE OF OPERATION 5

Mode of Operation 5 provides multiplexing to the host port of a single message from a selected port. You select a specific peripheral port and a single message from that peripheral port is sent to the host device when the host device requests it. Each message is preceded by a port identification number.

5.1.7.6 MODE OF OPERATION 6

Mode of Operation 6 provides time-division multiplexing. In this mode, the Model 24H continuously scans all ports to check for characters in the receive buffers. If a receive buffer contains data, the data is transmitted to the host device preceded by a port identification code corresponding to the peripheral port number from which the data block came. Transmission continues until the buffer is empty or until a user-specified data block length has been transmitted.

5.2 OPERATING IN THE DIFFERENT MODES

A typical application using a Model 24H would have a host computer, such as an IBM PC, connected to the host port, and various devices (such as cash registers, digital laboratory instruments, bar code readers, numerical machines, printers, modems, terminals, etc.) connected to the peripheral ports.

Regardless of the mode of operation, the host device may connect and send data to a specific peripheral port by sending the appropriate *port select sequence* followed by the data. A port select sequence consists of the port select code followed by the desired peripheral port number (02 to 24) and a terminating character (0A Hex - *Carriage Return* or 0D Hex - *Line Feed*). The port select sequence is trapped and therefore not passed through to the selected peripheral port.

NOTE: For demonstration purposes, we will refer to the port select code as $SELECT. The port select code may actually be any user-defined character string up to eight ASCII characters. The 8th bit or parity bit is masked from the port select code before it is examined, allowing you to send the port select code with odd or even parity. Therefore, when 8 data bits are being sent, only the first seven data bits are examined.

In modes of operation 2 through 5, each message sent to the host device is preceded by a port identification number. This port identification number consists of the port number of the peripheral port that received the message. This number may range from 02 (for Port 2) to 24 (for Port 24).

To clear the receive buffer for a selected peripheral port, send **$SELECT** followed by ASCII capital **R** and a terminating character (0D Hex - *Carriage Return* or 0A Hex - *Line Feed*). All complete or partial messages in the buffer of the selected peripheral port will be erased regardless of the mode of operation.

5.2.1 OPERATING IN MODE 1

In Mode of Operation 1, the Model 24H will provide full duplex communication between the host port and the selected peripheral port. Port 2 is the selected peripheral port when the Model 24H powers up. The host port and the selected peripheral port will remain connected until a different peripheral port is selected. This is accomplished by sending a port select sequence. Data received by non-selected peripheral devices will be stored in the Model 24H's buffer and then sent to the host device when the peripheral port is selected.

When switching between peripheral ports, there may be some question as to which is the last character received from the current port and which is the first character received from the new port. To avoid this potential confusion, it is recommended that you use the following port selection example when selecting a different port for communication. Suppose you are transmitting and receiving data from Port 2 and you wish to switch to Port 3. Use the following procedure:

1. Send **$SELECT** and nothing else.
2. Wait for at least one and one-half character times of the host port, but no longer than ten seconds (see NOTE below).
3. Check the receive buffer of the host device for any characters from the currently selected peripheral port while delaying. If no character(s) are in the host device's receive buffer send **03** followed by ***Carriage Return*** or ***Line Feed*** to select Port 3. If there are characters in the host's receive buffer repeat step 2 before sending 03 and the terminating character. The Model 24H does not start loading data from the new peripheral port into the host port until the new peripheral port number and terminating character are received.

NOTE: The port select sequence has a ten second timer. The timer starts when the first character of the port select sequence is received. Any incomplete sequence received ten seconds or more after the first character has been received will be treated as normal data and will be sent to the current selected peripheral port.

5.2.2 OPERATING IN MODE 2

Mode of Operation 2 provides automatic message multiplexing between the host port and up to twenty-three peripheral ports. Data received from the peripheral devices is treated as messages. A message begins when a peripheral port receives a character from the device connected to it. A message is completed when the message terminating character is received or when the buffer is full. Either condition will result in the message(s) being transferred to the host device with the Model 24H inserting the peripheral port number prior to the actual message. Messages will be sent automatically to the host device in a round-robin fashion (e.g., if the Model 24H is sending a message from Port 2, Port 3 will be examined next for a complete message, then Port 4, etc.).

NOTE: The host device may select and transmit data to any peripheral port while simultaneously receiving all messages from all peripheral ports.

5.2.3 OPERATING IN MODE 3

Mode of Operation 3 provides message multiplexing to the host port of single messages from all peripheral ports upon request from the host device. A single message from all ports is sent to the host device only when a command is received from the host device. The command for requesting a single message from all peripheral ports is the port select code (**$SELECT** default) followed by ASCII capital ***S***, and a terminating character (0A Hex - ***Carriage Return*** or 0D Hex - ***Line Feed***). If there are no messages, the host port will send a *Line Feed* character to the host device.

NOTE: The host device may select and transmit data to any peripheral port while simultaneously receiving single messages from all peripheral ports.

5.2.4 OPERATING IN MODE 4

In Mode of Operation 4, all messages from a single peripheral port are sent to the host port automatically. The host device may receive all complete messages in the buffer of a selected port by sending the port select code (**$SELECT** default) followed by ASCII capital **S**, the desired port number (**02** to **24**), and a terminating character (0A Hex - ***Carriage Return*** or 0D Hex - ***Line Feed***).

NOTE: The host device may select and transmit data to any peripheral port while simultaneously receiving all messages from a single port.

5.2.5 OPERATING IN MODE 5

In Mode of Operation 5, a single message is sent to the host port from a selected peripheral port upon request. The host device may receive one complete message from a selected peripheral port by sending the port select code (**$SELECT** default) followed by ASCII capital **S**, the desired port number (**02** to **24**), and a terminating character (0A Hex - ***Carriage Return*** or 0D Hex ***Line Feed***). If there are no messages for the selected peripheral port, the host port will send a *Line Feed* character to the host device.

NOTE: The host device may select and transmit data to any peripheral port while simultaneously receiving single messages from a single port.

5.2.6 OPERATING IN MODE 6

Mode of Operation 6 provides time-division multiplexing. The internal processor continuously scans all peripheral ports checking for characters in the receive buffers. If a receive buffer contains characters, this data is transmitted through the host port preceded by a port identification code (the port select code followed by the peripheral port number). Transmission continues until the buffer is empty or until a user-defined data block length has been transmitted (8 to 240 characters). After transmission is completed, the Model 24H will continue its scanning sequence.

NOTE: The host device may select and transmit data to any peripheral port while simultaneously receiving data blocks from all peripheral ports.

5.3 LED INDICATORS

Upon power-up, all LEDs will illuminate while the unit goes through a self-test. Upon completion of the power-up self-test, the LEDs for Port 1 (the host port) and Port 2 will illuminate indicating a connection between the host port and Port 2.

While in operation mode, the LED indicators on the front panel show which peripheral port the host port is currently connected to when sending data from the host device to a specific peripheral device. There should only be two LEDs illuminated at any given time during operation, the host port LED (Port 1) and the currently selected peripheral port. All ports are labeled by port number.

NOTE: When you access configuration mode (see *Section 6*), all red LEDs on the front panel will illuminate.

If you notice more than two LEDs on the front panel illuminated after initial power-up while in operation mode, please contact a BayTech Applications Engineer (see *Section 8*).

5.4 BINARY MODE

Binary mode allows all data received by the host port to be passed through to the selected peripheral port including the port select sequence. Binary mode is useful when sending binary data (i.e., data in a format other than ASCII) to the selected peripheral port and it is possible that the bit pattern for the port select code may be part of the data stream. Binary mode is also useful if you wish to pass the port select sequence to the selected peripheral port.

To access binary mode, the host device sends the Port Select Code (factory default is **$SELECT**) followed by ASCII capital **B** and a terminating character (0D Hex - *Carriage Return* or 0A Hex - *Line Feed*). While operating in binary mode, you will be unable to access configuration mode or select a different peripheral port. To exit binary mode, the host port must see a "BREAK CONDITION".

NOTE: You may access binary mode regardless of the mode of operation you are operating in.

5.5 DATA FLOW CONTROL

5.5.1 HARDWARE HANDSHAKING

NOTE: The following discussion for hardware handshaking assumes you have DTE serial ports installed on the Model 24H.

Host-to-Model 24H-to peripheral communication:

When the host device transmits data to the Model 24H host port, the data is received and stored in a 426 character buffer which in turn retransmits it to a selected peripheral device through a peripheral port. During transmission, when there are only 19 bytes available in the buffer, the Model 24H will make the host port's DTR (Data Terminal Ready) line false (negative voltage), signaling the host device that it cannot accept more data. When the buffer of the Model 24H can receive more data, the unit will make the host port's DTR line true (positive voltage).

When the Model 24H retransmits the data to the peripheral device and the peripheral device cannot receive any more data, the Model 24H will expect to detect a false condition on the peripheral port's CTS (Clear-to-Send) line. When the peripheral device can receive more data, the Model 24H will expect to see a true condition on the CTS line.

Peripheral-to-multiport-to-host communication:

When a peripheral device transmits data to the a Model 24H peripheral port, the data is received and stored in a buffer (512K standard, available up to 4.5 MB) which in turn retransmits the data to the host device through the host port. During transmission when there are only 15 bytes left in the buffer, the Model 24H will make the peripheral port's DTR line false signalling the peripheral device that it can no longer accept data. When the buffer empties to the point where it can accept more data, the Model 24H will make the peripheral port's DTR line true.

When the Model 24H retransmits the data to the host device and the host device can no longer accept data, the Model 24H will expect to detect a false condition on the host port's CTS line. When the host device can accept more data, the Model 24H will expect to detect a true condition on the CTS line.

5.5.2 XON/XOFF HANDSHAKING

The Model 24H permits XON/XOFF to be enabled or disabled by port independently in the receive and transmit directions. The description of handshaking functions below considers XON/XOFF to be enabled in both directions. If XON/XOFF is disabled in one direction, that direction will support hardware handshaking as described in *Section 5.5.1*.

When XON/XOFF is enabled in the receive direction, the DTR line will always remain high and will not be used as a handshaking line. When transmitting data and the Model 24H receives an XOFF character, it must receive an XON character and detect a true condition on the CTS line to restart sending data.

NOTE: When sending binary data and using XON/XOFF handshaking, the input flow control (Recv) of the respective port should be enabled and the output flow control (Xmit) should be disabled. This will allow any binary character with the same bit pattern as XON or XOFF to be passed to the receiving device.

Host-to-Model 24H-to peripheral communication:

When the host device transmits data to the Model 24H host port, the data is received and stored in a 426 character buffer which in turn retransmits it to a selected peripheral device through a peripheral port. During transmission, when there are only 19 bytes available in the buffer, the Model 24H will send an XOFF character, signaling the host device that it cannot accept more data. When the buffer of the Model 24H can receive more data, the unit will send an XON character.

When the Model 24H retransmits the data to the peripheral device and the peripheral device cannot receive any more data, the Model 24H will expect to receive an XOFF character. When the peripheral device can receive more data, the Model 24H will expect to receive an XON character.

Peripheral-to-multiport-to-host communication:

When a peripheral device transmits data to a Model 24H peripheral port, the data is received and stored in a buffer (512K standard, available up to 4.5 MB) which in turn retransmits the data to the host device through the host port. During transmission when there are only 15 bytes left in the buffer, the Model 24H will send an XOFF character signalling the peripheral device that it can no longer accept data. When the buffer empties to the point where it can accept more data, the Model 24H will send an XON character.

When the Model 24H retransmits the data to the host device and the host device can no longer accept data, the Model 24H will expect to receive an XOFF character or detect a false condition on the host port's CTS line. When the host device can accept more data, the Model 24H will expect to receive an XON character and detect a true condition on the CTS line.

6 CONFIGURATION

Configuration changes are made through the host port which is Port 1. Port 1 must always be a serial port to allow configuration to occur. Once the configuration mode has been accessed, all LEDs will illuminate and will remain illuminated while configuration is occurring.

To access the configuration mode of the Model 24H, use the following procedure:

1. Connect a dumb terminal (or a PC running a terminal emulation program) to Port 1. Configure your terminal's serial parameters to match those of the Model 24H. From the factory, all serial ports on the Model 24H are factory set at 9600 baud rate, 8 word size, 1 stop bit, no parity, and XON/XOFF disabled.

   If you do not have a dumb terminal or a terminal emulation program, BayTech supplies a utility diskette which includes software to put an IBM PC or compatible into a terminal mode (TERM.EXE). Please see *Section 3.2*.

2. Send from this device ***Control-T*** (14 Hex) followed by ASCII capital **C** (43 Hex).

   NOTE: If you are using the TERM.EXE program supplied on the software utility diskette, you may depress the F1 key to send *Control-T* followed by *C*.

   You should receive the main configuration menu and all the red LEDs on the front panel should illuminate. If this does not happen, please refer to the Troubleshooting Guide (see *Appendix A*).

6.1 MAIN CONFIGURATION MENU

The Model 24H will respond to the receiving of *Control-T* and Capital *C* with an identification block and a menu of the configuration options available, similar to the following:

```
(C)Copyright Bay Technical Associates 1988
Data Exchange System - Model 24H
Version 1 Revision 1.00
Total Memory : 0512K Bytes

Status.....1
Serial Port Configuration.....2
Change Parallel Port Designation.....3
Change Port Logical Name.....4
Program Port Select Code.....5
Change Message Terminate Character.....6
Change Data Block Length.....7
Change Mode of Operation.....8
Exit.....X
```

NOTE: Menu selection is case sensitive. It is recommended that your keyboard be in the CAPS LOCK position.

6.2 STATUS

By responding to the *Enter Request*: Message at the end of the main configuration menu with "1" (Status), you may review the current configuration status of the Model 24H.

NOTE: Some characters will be displayed in HEX notation in the configuration mode which will appear with an "H" suffix.

The Model 24H will respond with:

```
Current Serial Port Configuration :
+------+------------------+-------+------+------+------+------+------+
| Port |  Logical Name    |  Baud | Word | Stop |Parity|  Xon / Xoff |
|      |                  |  Rate | Size | Bits |      | Xmit | Recv |
+------+------------------+-------+------+------+------+------+------+
|   1  | Device A Host    |  9600 |  8   |   1  | None |  Off |  Off |
|   2  | Device B         |  9600 |  8   |   1  | None |  Off |  Off |
|   3  | Device C         |  9600 |  8   |   1  | None |  Off |  Off |
|   4  | Device D         |  9600 |  8   |   1  | None |  Off |  Off |
|   5  | Device E         |  9600 |  8   |   1  | None |  Off |  Off |
|   6  | Device F         |  9600 |  8   |   1  | None |  Off |  Off |
|   7  | Device G         |  9600 |  8   |   1  | None |  Off |  Off |
|   8  | Device H         |  9600 |  8   |   1  | None |  Off |  Off |
|   9  | Device I         |  9600 |  8   |   1  | None |  Off |  Off |
|  10  | Device J         |  9600 |  8   |   1  | None |  Off |  Off |
+------+------------------+-------+------+------+------+------+------+

Strike any Key to Continue, or X to Exit

Current Parallel Port Designation:
+------+------------------+-------------+
| Port |  Logical Name    | Destination |
+------+------------------+-------------+
|  11  | Device K         |  Input Port |
|  12  | Device L         | Output Port |
+------+------------------+-------------+

Strike any Key to Continue, or X to Exit

Current Port Select Code is ..............$SELECT
Current Terminate Character is.............0DH
Current Block Length is....................32
Current Mode of Operation is..............1

Strike any Key to Continue, or X to Exit
```

```
                OPERATION PROTOCOL
+------+------------------------+-----------+------+------+
| Mode | Host port Control Code  |  Receive  | Rcv. | Rcv. |
|  of  +------------+-----------+    Port   | Term |Block |
| Opern| XMIT data  | RCV data  |    I.D.   | Chr. |Length|
+------+------------+-----------+-----------+------+------+
|  1   | $SELECTm,p | $SELECTm,p | ---N/A--- | -N/A | -N/A |
|  2   | $SELECTm,p | ----N/A--- |    m,p    | 0DH  | -N/A |
|  3   | $SELECTm,p | $SELECTS   |    m,p    | 0DH  | -N/A |
|  4   | $SELECTm,p | $SELECTSm,p|    m,p    | 0DH  | -N/A |
|  5   | $SELECTm,p | $SELECTSm,p|    m,p    | 0DH  | -N/A |
|  6   | $SELECTm,p | ----N/A--- | $SELECTm,p| -N/A | 32   |
+------+------------+-----------+-----------+------+------+
H = Hexadecimal , S = ASCII  53H  , ^ = ASCII 00H to 1FH
m,p - Module, Port Number and CR or LF

Strike any Key to Continue, or X to Exit

Status.....................................1
Set Serial Port Configuration..............2
Change Port Logical Name...................3
Program Port Select Code...................4
Change Message Terminate Character.........5
Change Data Block Length...................6
Change Mode of Operation...................7
Exit.....................................X

Enter Request :
```

You may now make whatever changes are necessary by responding to the above menu. The Exit function will return you to the Operations Mode.

6.3 SET SERIAL PORT CONFIGURATION

By responding to the *Enter Request:* message at the end of the main configuration menu (see *Section 6.1*) with "2" (Set Serial Port Configuration), you may change the serial configuration of each port (i.e. baud rate, word size, stop bits, parity, and XON/XOFF handshaking). Each port is configured individually. This allows the Model 24H to translate between devices of different configurations without the need to reconfigure the devices. The Model 24H will respond with:

```
Enter Serial Port Number (? = Help, ENTER = Exit) :
```

Type the number of the desired serial port followed by <ENTER>. If you type "?", the Model 24H will respond with a menu showing the current configuration status of all serial ports. For example, if you type "7" and <ENTER>, the Model 24H will respond with the current status of Port 7 and a menu of the available options.

```
+------+------------------+-------+------+------+------+------+------+
| Port |  Logical Name    |  Baud | Word | Stop |Parity|  Xon / Xoff |
|      |                  |  Rate | Size | Bits |      | Xmit | Recv |
+------+------------------+-------+------+------+------+------+------+
|   7  | Device D         |  9600 |  8   |   1  | None |  Off |  Off |
+------+------------------+-------+------+------+------+------+------+
Exit/Save.....1  Set Stop Bits.....4
Set Baud Rate..2  Set Parity........5
Set Word Size..3  Set Xon/Xoff......6

Enter Request :
```

You may now reconfigure Port 7 by selecting the appropriate option (1-6) from the menu. For example, to change the baud rate to 38400 baud, type "2" (Set baud rate). The Model 24H will respond with:

```
1   For    300
2   For    600
3   For   1200
4   For   2400
5   For   4800
6   For   9600
7   For  19200
8   For  38400

    Enter Request :
```

Enter "8" for 38400 baud rate, and the Model 24H will respond with the reconfigured status of the port, the option menu, and the prompt:

```
+------+------------------+-------+------+------+------+------+------+
| Port |  Logical Name    |  Baud | Word | Stop |Parity|  Xon / Xoff |
|      |                  |  Rate | Size | Bits |      | Xmit | Recv |
+------+------------------+-------+------+------+------+------+------+
|   7  | Device D         | 38400 |  8   |   1  | None |  Off |  Off |
+------+------------------+-------+------+------+------+------+------+
Exit/Save......1  Set Stop Bits.....4
Set Baud Rate..2  Set Parity........5
Set Word Size..3  Set Xon/Xoff......6

Enter Request :
```

You may now select other options from the menu to reconfigure Port 7. For example, to set XON/XOFF, type "6" (Set Xon/Xoff) in response to the prompt. Note that Output Flow Control and Input Flow Control are set separately for each port. The Model 24H will respond with:

```
Output Flow Control (Xmit) - Xon/Xoff is ( Off )
Stop/Restart Output Upon Receiving of Xoff/Xon ? (Y/N) :
```

You should then enter "Y" to enable XON/XOFF on transmit, "N" to disable XON/XOFF on transmit. For example, if you entered "Y", the Model 24H will respond with:

```
Input Flow Control (Recv) - Xon/Xoff is ( Off )
Xoff/Xon sent based on Buffer - Full/Empty condition ? (Y/N) :
```

You should then enter "Y" to enable XON/XOFF on receive, "N" to disable XON/XOFF on receive. For example, if you enter "N", the Model 24H will respond with the reconfigured status of the port, the option menu and the prompt.

```
+------+------------------+-------+------+------+------+------+------+
| Port |  Logical Name    |  Baud | Word | Stop |Parity|  Xon / Xoff |
|      |                  |  Rate | Size | Bits |      | Xmit | Recv |
+------+------------------+-------+------+------+------+------+------+
|   7  | Device D         | 38400 |  8   |   1  | None |  On  |  Off |
+------+------------------+-------+------+------+------+------+------+
Exit/Save......1  Set Stop Bits.....4
Set Baud Rate..2  Set Parity........5
Set Word Size..3  Set Xon/Xoff......6

Enter Request :
```

If there are no other changes for this port, send "1" (Exit/Save), and the Model 24H will respond with:

```
Save Changes Permanently ? (Y/N) :
```

NOTE: When changing the configuration of the host port, port 1, the Model 24H will also respond with:

```
Change This Device to NEW Configuration
Before Answering the Request
Save Changes Permanently? (Y/N) :
```

This reminds you to change the host PC's or terminal's configuration to match the new configuration of the host. If they do not match, you will be locked out of the Model 24H and unable to access its functions.

CAUTION: If the serial configuration of the device you are configuring from is not changed to match the new configuration of the port, you will be locked out of the Model 24H and unable to access its functions. If this happens, you must recycle power on the unit and start the configuration process over.

If you answer "Y" (yes), the new configuration for that port will be stored permanently in non-volatile memory, and the Model 24H will subsequently power-up at that configuration. If you answer "N" (no), the new configuration will be stored in RAM, and on the next power-up, the Model 24H will revert to the previous configuration. The Model 24H will then respond with the following prompt:

```
Enter Serial Port Number (? = Help, ENTER = Exit) :
```

Enter the number of any other serial port that you wish to reconfigure. If you do not wish to reconfigure any other serial port, type <ENTER> and the Model 24H will return the main configuration menu (see *Section 6.1*).

6.4 CHANGE PARALLEL PORT DESIGNATION

NOTE: This section is applicable only if you have parallel ports installed.

By responding to the Enter Request: message at the end of the main configuration menu (see *Section 6.1*) with "3" (Change Parallel Port Designation), you may change the designation of a selected parallel port to be an input or output. The Model 24H will respond with:

```
Enter Parallel Port Number (? = Help, ENTER = Exit) :
```

Type the number of the desired parallel port followed by <ENTER>. If you type "?", the Model 24H will respond with a menu showing the current configuration status of all parallel ports. If a character is entered that is not a parallel port number, the Model 24H will respond with a prompt to type a parallel port.

For example, if you type "12" and <ENTER>, the Model 24H will respond with the current status of Port 12 and a menu of the available options.

```
+------+------------------+-------------+
| Port |  Logical Name    | Destination |
+------+------------------+-------------+
|  12  | Device L         | Output Port |
+------+------------------+-------------+

Change to Input or Output Port ? (I/O) :
```

The Model 24H gives you the choice of Input or Output for the designated parallel port. Type "I" to designate the selected parallel port as an input port or "O" to designate the selected parallel port as an output port. If you designate the selected parallel port as an input port, data will flow from the parallel peripheral device to the host device only. If you designate the selected parallel port as an output port, data will flow from the host device to the parallel peripheral only when the host device selects the parallel peripheral port.

The Model 24H will then respond with the following prompt:

```
Enter Parallel Port Number (? = Help, ENTER = Exit) :
```

Enter the number of any other serial port that you wish to reconfigure. If you do not wish to reconfigure any other serial port, type <ENTER> and the Model 24H will return the main configuration menu (see *Section 6.1*). The Model 24H will exit from this menu when the operator strikes the *Enter* key. The unit will also exit when the operator enters the character "0" and then strikes the *Enter* key. The Model 24H will now return to the main configuration menu.

6.5 CHANGE PORT LOGICAL NAME

By responding to the Enter Request: message at the end of the main configuration menu (see *Section 6.1*) with "4" (Change Port Logical Name), you may enter a logical or identifying name for each device connected to the Model 24H. These logical names appear in the configuration menus only. The Model 24H will respond with:

```
Enter Port Number (? = Help, ENTER = Exit) :
```

Type the number of the desired port followed by <ENTER>. If you type "?", the Model 24H will respond with a menu showing the current logical names of all ports. For example, if you type "7" and <ENTER> for Port 7, the Model 24H will respond with :

```
+------+------------------+-------+------+------+------+------+------+
| Port |  Logical Name    |  Baud | Word | Stop |Parity|  Xon / Xoff |
|      |                  |  Rate | Size | Bits |      | Xmit | Recv |
+------+------------------+-------+------+------+------+------+------+
|   7  | Device D         | 38400 |  8   |   1  | None |  On  |  On  |
+------+------------------+-------+------+------+------+------+------+

Enter Logical Name (Max. 16 characters)
or ENTER for no change ...................:
```

You may now enter the new logical name for the device connected to this port. A maximum of 16 characters may be entered. If less than 16 characters are entered, the entry must be followed by striking the Enter key. For example, if you entered " *IBM MAIN FRAME* ", the Model 24H will respond with an updated menu and another prompt:

```
+------+-----------------+-------+------+------+------+------+------+
| Port |  Logical Name   |  Baud | Word | Stop |Parity|  Xon / Xoff |
|      |                 |  Rate | Size | Bits |      | Xmit | Recv |
+------+-----------------+-------+------+------+------+------+------+
|   7  | IBM MAIN FRAME  | 38400 |  8   |   1  | None |  On  |  On  |
+------+-----------------+-------+------+------+------+------+------+

Enter Logical Name (Max. 16 characters)
or ENTER for no change .....................:
```

If the logical name displayed is satisfactory, type <ENTER>. The Model 24H will respond with:

```
Enter Port Number (? = Help, ENTER = Exit) :
```

You may now program a new logical name for another port if desired or exit by striking the <ENTER> key. The Model 24H will save the new logical name(s) permanently in non-volatile memory and will subsequently power-up with the new name(s) in effect. The Model 24H will now return to the main configuration menu.

6.6 PROGRAM PORT SELECT CODE

By responding to the Enter Request: message at the end of the main configuration menu (see *Section 6.1*) with "5" (Program Port Select Code), you may change the Port Select Code to a user-defined code. This Port Select Code consists of any character string from 1 to 8 ASCII characters. The Model 24H will respond with the following:

```
Port Select Code is  :$SELECT
Enter Port Select Code (Max. 8 characters)
or ENTER for no change :
```

Type the new Port Select Code. If less than 8 characters are entered, you must follow entry by striking the *Enter* key. For example, if you entered #PORT, the Model 24H will respond with:

```
Port Select Code is :#PORT
Enter Port Select Code (Max. 8 characters)
or ENTER for no change :
```

NOTE: The Port Select Code should not begin with *Control-T*. Non-printable characters below 20 HEX (32 Decimal) are acceptable, but they will not appear in the Status menu. The port select sequence has a ten second timer, any incomplete sequence after this timeout period will be treated as normal data and will be sent to the current peripheral port.

If no additional change is desired, strike the <ENTER> key to exit. The Model 24H will save the new Port Select Code permanently in non-volatile memory and will subsequently power-up with that code in effect. The Model 24H will now return to the main configuration menu.

6.7 CHANGE MESSAGE TERMINATE CHARACTER

By responding to the Enter Request: message at the end of the configuration menu (see *Section 6.1*) with "6" (Change Message Terminate Character), you may custom set the terminating character for Modes of Operation 2, 3, 4 and 5. The Model 24H will respond with:

```
Current Terminate Character is.....0DH
Enter Terminate Character in Hex
or ENTER for no change .....:
```

Enter the terminating character that you wish in the form of a two-digit hexadecimal character. For example, if you enter "0A" (Line Feed), the data exchange system will respond with:

```
Current Terminate Character is.....0AH
Save Changes Permanently? (Y/N):
```

If you answer "Y" (yes), the new terminating character will be stored permanently in non-volatile memory, and the Model 24H will subsequently power-up with the new terminating character in effect. If you answer "N" (no), the new terminating character will be stored in RAM and lost upon next power-up. The Model 24H will now return to the main configuration menu.

6.8 CHANGE DATA BLOCK LENGTH

By responding to the Enter Request: message at the end of the configuration menu (see *Section 6.1*) with "7" (Set Data Block Length), you may change the data block length of Mode of Operation 6. The Model 24H will respond with:

```
Current Block Length is.....31
Enter Block Length (1 to 250).....:
```

Enter the block length that you desire, followed by <ENTER>. For example, if you enter "100" and <ENTER>, the data exchange system will respond with:

```
Current Block Length is.....100
Save Changes Permanently? (Y/N):
```

If you answer "Y" (yes), the new block length will be saved in non-volatile memory, and the Model 24H will subsequently power-up at that new length. If you answer "N" (no), the new data block length will be stored in RAM and will be lost upon next power-up. The Model 24H will now return to the main configuration menu.

6.9 CHANGE MODE OF OPERATION

By responding to the Enter Request: message at the end of the main configuration menu (see *Section 6.1*) with "8" (Set Mode of Operation), you may change the current mode of operation. The Model 24H will respond with:

```
MODE OF OPERATION
Full Duplex Communication.....1
All Messages from All Ports.....2
Single Message from All Ports.....3
All Messages from Selected Port.....4
Single Message from Selected Port.....5
Time Division Multiplexing.....6
Exit.....X

Current Mode of Operation is..... 1
Enter Mode of Operation :
```

You may now enter the mode of operation that you wish. The Model 24H will now return to the main configuration menu.

7 MAINTENANCE

Since there are no adjustments and no moving parts in the Model 24H, preventive maintenance is unnecessary.

7.1 RETURNS TO THE FACTORY

If you find it necessary to return your Model 24H to the factory for warranty work or factory-set changes, follow the procedure listed under *Section 7.2* for repacking.

Before you ship your unit, please call BayTech to get a Return Authorization Number. BayTech cannot accept warranty or no-charge returns without this number.

Ship your unit to the address listed in *Section 8*, - Technical Support.

7.2 REPACKING FOR SHIPPING

If you need to repack your unit for shipping, please choose a heavy cardboard box for packing. Surround your unit with sufficient insulation (a minimum of 2-inches) to withstand the rigors of transport. Be sure to seal the box securely with strapping or packing tape. Masking tape or cellophane tape is not recommended.

8 TECHNICAL SUPPORT

In the event that you have problems with the Model 24H, BayTech has a staff of applications engineers on duty to assist you from 7 am to 6 pm (CST or CDT), Monday through Friday. When you call BayTech Technical Support, please have the following information available to help the applications engineers answer your questions more efficiently:

1. Identify which modules you are using and have the serial number handy (located on the back of the unit).

2. Identify the host and peripheral devices you have connected to the Model 24H and the mode of operation you are using.

3. Identify any special equipment you are using (for example, in-line spoolers, networks, software drivers, etc.).

4. Identify what cables you are using, what the lengths of the cables are, and who sold you the cables.

5. Identify any options you may have ordered with your unit.

6. Identify the software packages you are using.

7. If possible, have a print-out of the Model 24H's configuration status ready when you call.

Always call BayTech <u>before</u> dismantling your equipment and/or returning the Model 24H to BayTech for repair.

Bay Technical Associates, Inc.
P.O. Box 387, 200 N. Second Street
Bay Saint Louis, Mississippi 39520 U.S.A.
Phone: 228/467-8231 or 800/523-2702
Fax: 228/467-4551
Web Site: baytechdcd.com

9 FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY INTERFACE STATEMENT*

This equipment generates and uses radio frequency energy and, if not installed and used properly (that is, in strict accordance with the manufacturer's instructions) may cause interference to radio and television reception. The equipment has been type tested and found to comply within the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference to radio or television reception will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

1. Reorient the receiving antenna.
2. Relocate the computer equipment with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

The Federal Communications Commission has prepared a booklet entitled "How to Identify and Resolve Radio - TV Interference Problems" which may be helpful to you. This booklet (stock #004-000-00345-4) may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

*Use of a shielded interface cable is required to comply within the Class A limits in Subpart J of Part 15 of FCC rules.

APPENDIX A
TROUBLESHOOTING

Please check this troubleshooting guide before calling BayTech Tech Support.

PROBLEM: CANNOT CONFIGURE M24H

SYMPTOM: "CONTROL-T" FOLLOWED BY "C" SENT IN TERMINAL MODE DOES NOT INVOKE CONFIGURATION MENUS.

CAUSE: Cable.
SOLUTIONS:

1) Check cabling between host computer and Model 24H.
2) Check handshaking lines using TERM program. All lines (except possibly DCD which is not used) should be high. If the lines are not high, compare the pinout of your cable with the pinouts shown in *Section 4*. If lines are high, turn the Model 24H off. You should notice CTS and DSR lines go low. If they do not go low, there is a good chance you have an error in your cable.
3) Check installation procedures for host computer's serial port. COM1 must generate an interrupt on IRQ4 (COM2 on IRQ3). Also, check any jumpers for defining port configuration which should be jumpered for DTE, not DCE.

CAUSE: Port configuration.
SOLUTION: Match baud rate, word size, stop bits, parity and handshaking between the Model 24H host port and the host device.

CAUSE: Port selection.
SOLUTION: Be sure host device is connected to the host port (Port 1) on the Model 24H.

CAUSE: Software.
SOLUTION: Use dumb terminal or a computer running a terminal emulation program (i.e., TERM supplied by BayTech, or another communications package).

CAUSE: Bad serial port on host computer.
SOLUTION: Try a different serial port or host device.

PROBLEM: GARBAGE DATA

SYMPTOM: MISSING CHARACTERS

CAUSE: No data flow control due to incorrect cable type.
SOLUTION: Check hardware handshaking lines in the cable. The CTS is the input flow control line and DTR is the output flow control line. Determine which flow control signals are defined as input and output for your equipment. Connect the CTS line to the signal defined as output and DTR to the signal defined as input. If using XON/XOFF handshaking, verify that both Tx and Rx are connected in the cable. Also verify that XON/XOFF handshaking is enabled on the Model 24H and that your equipment supports XON/XOFF.

CAUSE: Cable length.
SOLUTION: BayTech will guarantee EIA-232 serial data transmission up to 150 feet at 9600 baud. If your cable exceeds this length, either shorten your cable length or reduce the baud rate.

CAUSE: Configuration problem.
SOLUTION: Check baud rate, word size, stop bits and parity on serial ports. Make sure the ports on the Model 24H are configured to match the serial port parameters of your equipment.

SYMPTOM: RANDOM GARBAGE CHARACTERS

CAUSE: Serial port configuration.
SOLUTION: In the Model 24H's configuration mode,match baud rates, word size, stop bits, parity, and handshaking with the connected device.

CAUSE: Cable length.
SOLUTION: BayTech will guarantee EIA-232 serial data transmission up to 150 feet at 9600 baud. If your cable exceeds this length, either shorten your cable length or reduce the baud rate.

PROBLEM: CAN'T SELECT PERIPHERAL PORT FROM HOST DEVICE

SYMPTOM: LEDs ON THE FRONT PANEL DO NOT CHANGE WHEN SELECTING DIFFERENT PERIPHERAL PORT.

CAUSE: Incorrect port selection sequence.
SOLUTION: Verify the selection sequence the host device is sending to select the desired peripheral port. The port select sequence consists of the port select code ($SELECT - default), the desired peripheral port number (02 to 24), and a terminating character (*Carriage Return* - 0A Hex or *Line Feed* - 0D Hex).

CAUSE: Cable.
SOLUTION: Verify that the Tx and Rx signals as well the handshake signals for the host device are connected to the correct signals on the Model 24H. See *Section 4*.

CAUSE: Serial port configuration.
SOLUTION: In the configuration mode, match baud rates, word size, stop bits, parity, and handshaking with the connected device.

PROBLEM: CAN'T RECEIVE DATA FROM PERIPHERAL PORTS

CAUSE: Wrong peripheral port selected.
SOLUTION: If in Modes 3, 4, or 5, make sure the host device sends the correct port selection sequence and/or request for message command. See *Section 5.2*.

CAUSE: Peripheral device's cable.
SOLUTION: Verify that the Tx and Rx signals as well the handshake signals for the peripheral device are connected to the correct signals on the Model 24H. See *Section 4*.

CAUSE: Wrong Mode of Operation.
SOLUTION: Please review how to operate in the various modes and verify that the Mode of Operation you are operating in is the correct one for your application (see *Section 5.2*).

APPENDIX B
INDEX

A

ASCII 4, 12, 16, 18, 19, 21, 25, 28, 35
Asynchronous 3

B

Baud rate 2-4, 11, 25, 29, 30, 41-43
Binary mode 21
Buffer 1, 2, 4, 8, 9, 13-20, 22-24, 30

C

Cabling 2, 7, 8, 41
Case sensitive 26
CCITT 3
CDT 39
Centronics 3, 7
Character times 17
Communication 1, 3, 7-9, 14, 17, 22-24, 37
Configuration 2-4, 11, 12, 20, 21, 25-29, 31, 32, 33-37, 39, 41, 43, 44
Connectors 5, 7, 8
Control-T 25, 26, 35, 41
CST 39
CTS 5, 8, 9, 22-24, 41, 42
Current loop 3

D

Data block length 2-4, 11, 13, 15, 20, 26, 28, 37
Data Communication Equipment 8
Data flow control 22, 42
Data Terminal Equipment 8
DB-25 5, 7-10
Dimensions 4
Diskette 5, 6, 25
DOS 6
DSR 9, 41
DTE 3, 5, 8-10, 22, 41
DTR 5, 8, 9, 22, 23, 42
Dumb Terminal 25, 42

E

EIA-232 3, 7-9, 42, 43
EIA-422 3
Emulation 6, 25, 42
Environment 4
Eprom 6

F

Factory default 3, 11-14, 21
FAX 39
FCC 40
Full duplex communication 1, 3, 17, 37

G,H

Handshaking 5, 9, 11, 22, 23, 29, 41-44
Host port 2, 4, 13-25, 28, 31, 41, 42
Humidity 4

I

I/O module 9
IBM 3, 1, 7, 8, 11, 16, 25, 34
Identification block 26
Input Flow Control 23, 30, 42
Interface 3, 8, 40
Internal Buffer 4

J,K,L

LED 5, 6, 20
Logical name 3, 4, 12, 26-30, 32-34

M

Main configuration menu 25-27, 29, 31-37
Maintenance 38
Menu 2, 4, 11, 25-37
Menu selection 26
Message terminating character 11, 13, 14, 18
Mode of Operation 1-4, 14-21, 26-28, 37, 39, 45
Multiplexing 2, 1, 2, 11, 13-15, 18, 20, 37

N,O,P

Non-printable characters 35
Non-volatile memory 2, 4, 31, 34-37
Optional 3-6
Output flow control 23, 30, 42
Parity 2-4, 11, 16, 25, 27, 29, 30, 33, 34, 41, 43, 44
Pin assignment 7
Pinout 41
Port designation 26, 27, 32
Port expansion 3, 11
Port logical name 4, 12, 26, 28, 33
Port Select Code 2-4, 11, 12, 14, 16, 18-21, 26-28, 35, 44
Port selection 1, 14, 17, 42, 44, 45
Power cord 6
Power switch 6
Protective Ground 8, 9
Protocol 3, 7, 9, 28

Q,R

Rack-mount 5
RAM 31, 36, 37
Readme 6
Receive buffer 2, 15-17, 20
RTS 8, 9

S

Serial number 39
Serial port configuration 2, 11, 26-29, 43, 44
Signal ground 8, 9
Specifications 3, 40
Spooling 4
Status 26-30, 32, 35, 39
Stop bits 2-4, 11, 29, 30, 41, 43, 44

T

Technical Support 5, 38, 39
Television reception 40
Telex 39
Temperature 4
Term 6, 25, 28, 41, 42
Terminal 6, 8, 11, 22, 25, 31, 41, 42
Terminal emulation program 6, 25, 42
Terminating character 1, 3, 11-14, 16-19, 21, 36, 44
Time division multiplexing 2, 11, 13, 37
Timeout 35

U,V

User-defined character 16
User-programmable 4, 11
Utility software diskette 6
VAC 4, 6
Voltage 8, 22
Volts 8, 9

W

Warranty 5, 38
Weight 4
Word size 2-4, 11, 25, 29, 30, 41, 43, 44

X,Y,Z

XON/XOFF handshaking 11, 23, 29, 42

OTHER BAYTECH PRODUCTS

Print Master 700 Series printer controllers are made in several different configurations satisfying various interface requirements. Each unit allows computers to share, select and/or contend for printers easily and economically, without switching cables. The internal buffering system allows simultaneous, high-speed input from all connected computers and output to all printers. Models come in six, eight, and ten port sizes. All have a 1 MB, dynamically allocated buffer that may be expanded to 2 MB. The **706A** and **708A** all parallel port models feature super fast throughput (up to 60,000 characters per second) and an expandable buffer size up to 4 MB.

Print Master II 800 Series peripheral sharing devices connect between your computers, printers, plotters, modems and other peripherals. These models allow any of your computers to access any of your peripherals -- and talk to other computers so files can be transferred and data shared. Plus, a built-in buffer spools output data until your peripherals can receive it, freeing your computers to go on to other tasks. Models come in four, eight, and ten ports. Four port models have a 1 MB standard buffer which is expandable to 2 MB. Eight and ten port models have a 256 KB buffer which may be increased to 1.2 MB.

Model 24SII DES Data Exchange System is the fastest peripheral sharing solution available with throughput speeds up to 60,000 characters per second. The total number of ports may be expanded from 4 to 24 ports using 4-port I/O modules. Any port can be configured as an input or output port. The standard 1.0 MB buffer can be increased to 16 MB by user installed memory packages. Plus, using popular communications software, this unit allows for computer to computer high speed data transfer as well as modem sharing.

LaserShare is an intelligent printer controller that allows up to four or eight computers to send data to a single HP LaserJet laser printer. **LaserShare MIO** installs into the HP LaserJet Series IIISi, Series 4, and Series 4SI and will support serial speeds up to 460K bps. LaserShare connects directly into the optional I/O or MIO slot of the laser printer. Power is taken directly from the laser printer so there is no need for a power cord. LaserShare and LaserShare MIO can accept data from all ports simultaneously. Print jobs are printed on a first-in first-out basis. All LaserShare models come standard with a buffer that can range from 256K to 4MB. The buffer on LaserShare MIO models may range from 1MB to 4MB. **LaserShare 4C** and **LaserShare 4C MIO** come with four EIA-232C serial ports. **LaserShare 8C** and **LaserShare 8C MIO** come with eight serial ports, **LaserShare 4E** comes with two parallel and two serial ports, and **LaserShare 4A** and **LaserShare 4A MIO** come with four parallel ports.

* The LaserShare device for the Brother HL8e and HL8v is referred to as **LaserShare 4CB**. This device is available with four (4) serial computer ports and a fixed buffer size of 256KB.

The BayTech **Print Server Plus PS-4A**, **PS-4C**, and **PS-4A** models are user configurable, high speed, network print servers that support up to four peripherals including printers and modems. The **PS-4A** has four parallel ports, the **PS-4C** will has four high speed serial ports, and the **PS-4E** has two parallel and two high speed serial ports. The BayTech **LaserShare Network PS-MIO** is a network print server card which installs into the MIO slot of the HP LaserJet Series IIISi, Series 4, and Series 4Si laser printers. Each Print Server Plus is compatible with Novell NetWare 3.XX and 4.XX using normal NetWare commands and utilities (i.e., PCONSOLE, CAPTURE, and NPRINT). You may use an Ethernet 10BASE2 (thin coax) or 10BASE-T (twisted pair) network interface. The BayTech print server services up to 32 print queues distributed on as many as 32 file servers.

TRAN-X high speed parallel/serial converter products allow you to extend parallel cables to 1000+ feet and allow your network server, graphics workstation, or PC to send/receive data at speeds up to 46,000 characters per second. You can use the Tran-x Series with BayTech Model 24SII, LaserShare, or network print servers for the fastest long distance peripheral sharing solution available anywhere. Modular cabling provides simplicity in connections between remote devices. **Tran-x LPT-460** card plugs directly into your PC expansion slot. **Tran-x PS-02** connects to your PC's parallel port. **Tran-x SP-01** connects to the Centronics connector of a parallel printer. **Tran-x SP-02** connects to the DB-25 parallel port of the BayTech 700 Series Print Master, 800 Series Print Master II, or Model 24/24SII DES peripheral sharing units.

"500H" Series and **Model 24SII DAC Data Acquisition and Control** units connect between one host computer and multiple peripheral devices. These models are often used in industrial process-control environments (e.g., for allowing control of multiple numerical or assembly-line machines), in exchanging data between point-of-sale devices, or for operating a number of laboratory instruments or business machines from a central computer. They are especially effective in adapting small low-cost personal computers to these applications. Each unit features six modes of operation which may be easily configured to your application. The **500H** series models are available with either 5 or 9 ports. The **Model 24SII DAC** unit is expandable from 4 to 24 ports in 4-port modular increments.

Model M16 DAC and **Model M8 DAC Data Acquisition and Control** units are multifunction, user-configurable systems capable of providing a wide range of data collection, communications, and device control. Possible applications include security alarm monitoring process control, medical data systems control, manufacturing and environmental data control systems. BayTech provides a variety of host composite communication modules for remote and local control. These composite modules include EIA-232/422/485 and current loop, V.35 synchronous, DDS (CSU/DSU), Modem V.32bis/V.42bis 14.4K bps, IEEE 802.3 Ethernet 10BASE2 or 10BASE-T, or IEEE 802.5 Token Ring network. The M16/M8 is adaptable to a variety of applications by using various data acquisition modules which include 16SI/8DI, 12 Bit A/D Converter, 8 Channel Control Relay, 16 Channel Optical Isolated Input, 16 Channel Switched Input, EIA-232/422 4 serial I/O ports, or EIA 485/422 4 serial I/O ports. System configuration and

comprehensive data collection functions are provided through module configuration menus.

Telplex Models TX102, TX104 and TX108 are asynchronous statistical multiplexers which multiplex and demultiplex two, four, or eight communications channels over a single channel. This single channel is typically a telephone line or cable. The **Telplex TX24**, **TX28** and **TX60** will multiplex and demultiplex up to 20, 28, and 60 ports respectively. The **TX28** and **TX60** support ethernet, taken ring, EIA-232, EIA-422, V.35, and DDS communications. A Telplex pair may be connected using high speed asynchronous or synchronous modems or via cable up to 4000 feet. Telplex allows local and remote configuration and diagnostics. A terminal connected to a local Telplex may configure or perform diagnostics on the local unit. This same terminal may also configure or perform diagnostics on a remote Telplex if there is a communication link with the remote site. You may use Telplex in point-to-point, multiple location, daisy chained, or star configuration applications. The **TX28** and **TX60** allow for multiple composite modules which offer simultaneous communications with multiple remote locations.

Telplex Model TX104M is an asynchronous statistical multiplexer with built-in modem. Four individual communications channels are multiplexed into a single dial-up or leased telephone line, cutting phone line costs to a minimum. The TX104M features a V.22 bis internal modem which provides reliable communication at speeds up to 4800 bps. With V.42 bis protocol, the TX104M provides error correction and Classes 2-4 data compression. Compatible with most computers, printers, or peripherals, the TX104M ensures rapid throughput, and offers a variety of user-programmable features in order to meet your specific application requirements.

The **BX2448** is a V.22 bis external modem which uses deal-up or leased telephone lines and comes equipped with many advantageous features, such as MNP Class 5 data compression, which enables data transmission at speeds to 4800 bps and, MNP Classes 2 - 4 error correction. A wide selection of user-programmable features allows you to customize the modem to your own individual application.

500 SERIES MULTIPORT CONTROLLERS

Included in the **500 Series** line of multiport controllers are units intended for the following applications:

Port Expansion (A-Series): Allows a single serial port on a computer to individually access up to 17 peripheral devices with full duplex communication.

Single Port Contention (DQ-Series): Allows up to 17 terminals to contend for a single port on a computer system.

Multiple Port Contention (B-Series): Allows either 6, 8 or 12 terminals to contend for either 3, 4 or 6 computer ports respectively.

Networking (F-Series): Networks either 5 or 9 ports together, i.e., allows any port to connect to any other port on the multiport controller. These also have host port control which allows a host computer system to make and/or break any connection between two ports on the multiport controller.

Broadcasting (G-Series): Will simultaneously broadcast whatever data is received on the host port out to either 4 or 8 peripheral devices while sending data from a single selected peripheral device back to the host device. This unit is also capable of operating in a port expansion mode such as the **A-Series**.

Auto T-Switch (T-Series): Allows a group of up to 6 terminals to switch between two computer systems.

NOTE: All ports on the **500 Series** are standard with EIA-232 ports. EIA-422 and Current Loop ports are optionally available.

If you have questions concerning any of BayTech's products, please feel free to call a BayTech Applications Engineer at either (800)523-2702 or (601)467-8231.

NOTES

NOTES